Counterpoise

Amateur Radio Club of El Cajon

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Counterpoise Editor - Susan Robins AF6LJ

HSMM Mesh Presentation

by Sue Robins AF6LJ

Broadband-Hamnet also known as HSMM-Mesh is a broadband network that can be used as a replacement backbone for public safety agencies, and other services during times of disaster, or when access is limited to Internet services by other means. This network is comprised of nodes made from modified Linksys wirelesses routers. The firmware contained in these routers has been rewritten to allow the wireless access point portion of the router to communicate with others of it's type. The nodes are self-discovering, a node can enter and leave the mesh network at any time without interruption of data flow within the network.

At our August meeting Andre Hanson K6AH gave an impressive presentation of what HSMM-Mesh networks are and how they can be used. The true power in this network lies in it's ability to interface to existing infrastructure, thereby allowing personnel in the effected agency to use the applications they normally use to carry out their day to day operations. As far as the end users and their software are concerned the network appears to be the Internet. The agency that uses this network must provide their server side applications in some form, ether a connection to an existing server or a backup server. The network is capable of handling all manner of services an agency may need to use, services like whiteboard, text and video chat, Web Servers, Mail Servers, remote control of computers (VNC), anything that can be done on almost any computer network.

Since these routers were regulated under Part-15, and have been modified for for use other than what they were intended for, there are some restrictions as to the use of, and the content that can be transmitted over an HSMM-Mesh network. Since these routers are being used in the amateur radio service they are subject to the rules and

ARCEC Repeater Frequencies

2 Meter Repeater	220 MHZ Repeater	440 MHZ Repeater
TX 146.475	TX 220..480	TX 440.900
RX 147.420	RX 224.080	RX 445.900
Offset .945	Offset 1.6	Offset 5.00
PL 107.2	PL 107.2	PL 107.2

regulations set down in Part-97. This is a subject of considerable discussion among the HSMM-Mesh community according to Andre, there are those who have been concerned enough about the types of traffic passed that rule making proposals have been submitted to the FCC to allow encrypted communications. The ARRL does not back such a rule change and conventional wisdom suggests the FCC will most likely deny the rule change.

There are advantages to operating these routers under Part-97, not the least of which is overcoming the power and antenna restrictions imposed by Part-15. Even with the .6 W output of these routers, a high gain directional antenna will do a great deal for increasing the usable distance of these devices. Power could be increased, and with a band full of 2.4GHZ Part-15 devices a ham who decides to increase the output power to a few watts, in combination with a high gain omni directional antenna could become very unpopular in the neighborhood. Andre pointed out in the presentation that increasing the power of the routers is not necessary and when using small dish antennas at both ends a communication link of 60 miles is possible.

The mobility of this type of network cannot be overstressed. Mobile command posts and deployable nodes like the prototype seen to the right make it possible to bring the network to where the work is to be done with a minimum of effort. The deployable node prototype shown here has it's own solar charge controller, a camera mount housing, a dish antenna, battery, space for the router, a computer, and an IP telephone exchange. Right now the Linksys routers are the most supported. Other routers including but not limited to Ubiquity, and routers that are of the OpenWRT architecture.

I would like to thank Andre Hanson K6AH for taking the time and traveling down to our club to put on his very comprehensive talk on HSMM-Mesh, this was a most interesting presentation. For more information on HSMM-Mesh visit; http://www.hsmm-mesh.org/ . Everything you need to know is there all in one place, from the basics to working examples of HSMM-Mesh networks, and discussion forums. Firmware downloads are also available.

ARCEC Club Picnic

Sue Robins AF6LJ

On Saturday August 10th ARCEC held our annual picnic at Chollas Lake Park in the city of San Diego. Turnout was light, however all who attended had a good time. The club picnic is a good time to enjoy the fellowship of club members in the great out doors, and explore the interests other members have other than radio. The weather was typical for San Diego and a

light breeze topped off the perfect day for a picnic. Hope to see you there next year.

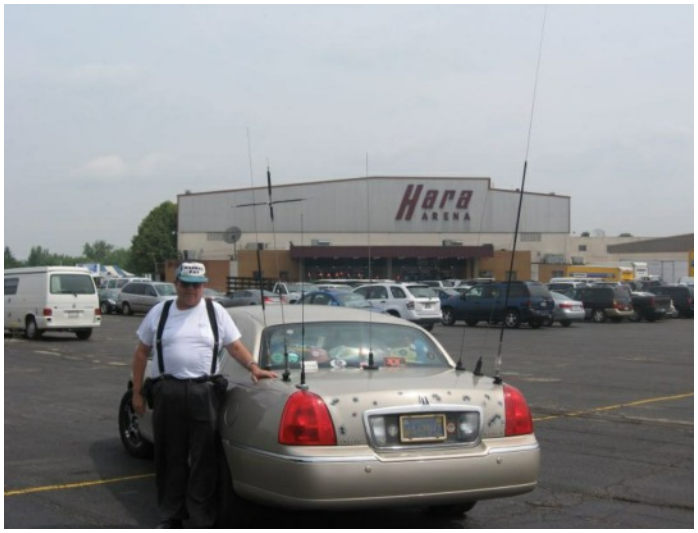
Homebrew Contest Coming Up In October

At the October 10th meeting ARCEC will be holding the annual homebrew contest. Building amateur radio gear of all kinds is a staple of the hobby. Hams build all manner of equipment, receivers, transmitters, test equipment, just about anything that can be bought off the shelf can be built. Bring out your projects and show your technical skills, beginner or old pro. There is a great deal of empowerment that comes from building even the simplest of projects. The skills acquired in the process will last a lifetime and are usable in other fields besides amateur radio. Don't like to build gear, you say? Come by and see what others are doing.

Next Month's Meeting

Dayton 2013: The Adventure

At our September 12th Pat WA6MHZ will present his movie chronicling his trip to the Dayton Hamvention, and sightseeing along the way. This promises to be both informative and entertaining, hope to see you there.



Editor's Notes

Sue Robins AF6LJ

For a new ham the single most expensive item she or he will have is usually a radio, this could be a $10,000.00 HF radio or a $49.00 HT from China. Next comes antennas transmission lines and those innumerable accessories. When something stops working the new ham can be totally lost in figuring out what is wrong, regardless if she or he can, or is willing to fix it.

This article isn't about rather you should or should not fix your own gear, that is for you to decide. We come into this hobby with our sights set on what we want to do. While I wouldn't expect someone who just wants to help run events or do EMCOM to get out a hot air rework station and replace some surface mount part the size of flake of pepper, however it is good to have a few basic skills so that when something does go wrong you can narrow the problem to, radio, transmission line, antenna, battery / power supply.

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Secretary's Ramblings

By Paul Thompson – KJ6BYF

Monthly Disclaimer: This is a recap of the activities of the Amateur Radio Club of El Cajon. I will be reporting the highlights of the General Meeting and the Board of Directors meeting. Please note that this column is not the official minutes of any meeting. I might even throw in a few of my own editorial comments here and there. When I do that I will let you know that they are my comments and only my comments! OK! Here we go…

August Highlights: Andre Hansen (K6AH) gave a presentation on High Speed Mesh Networks. I will have to get my old Linksys 2.4Ghz router out of closet and try this mesh network thing!

Start My Comments:

OK. I have been doing this column for a few issues, so let's take a highly unscientific poll. I would like to know how many persons are reading the Counterpoise and/or this column. If you read this, please send an email to . You can make the email as simple as; "Yes I read it", or, longer if you want to add any comments. I'm asking for this feedback to try to see how effectively the Counterpoise is getting to the membership. Thank you in advance.

I'm going to say this one again. (I know it is at least the 3rd time I have said it!)It's time to get involved in the club. If you don't like what is happening, get involved and change it! When nomination and voting time comes around nominate more than one person for each of the officer positions. Instead of 4 or 5 board nominations, let's shoot for twelve! That's 2 per board position. Then get out the vote! You **CAN** make a difference.

End My Comments.

Busted QSO's:

No one's yelling yet! It seems my record is intact. I welcome any suggestions that will help make this column better. Please email them to secretary@wa6bgs.us.

Until next time…

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A Message From The Editor

Counterpoise is evolving, your input is valued and appreciated, please send comments and suggestions to the address below.

See your name in print; if you have any content you would like to see published in Counterpoise please send it to counterpoise@wa6bgs.us

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With a few simple tools a ham can easily find the bad component and minimize the trips, and money spent to buy replacement items.

The first item on the list every ham should have is a watt meter / SWR bridge, this instrument will indicate if there is a fault in the antenna system or transmission line. Many new hams will show up on forums looking for help, maybe they cannot make a contact over the radio, or the radio is acting strange. The first question asked by someone willing to help is “do you have a watt meter?” All too often the answer is ether, “I only have the meter built in the radio”, or “I don't have one”. This makes troubleshooting almost impossible, some kind of test gear is needed to see what is coming out of the radio, even a cheap watt meter is better than none at all. The meter circuit in the radio is almost never directly at the output of the radio, there is usually something between that circuit and the output connector on the radio, so an external meter is necessary. With a watt meter / SWR bridge we have 1 of the 2 most important pieces of test gear a ham can have, the next item is just as important.

The next important item is a dummy load, with just these two pieces of gear we can determine if the transmitter is putting out the correct amount of power, we can test coax jumpers, and measure loss in transmission lines we plan on using. For every peace of gear I have in my shack that transmits I have a suitable dummy load, connecting cables, and a watt meter, there is no guesswork I know if the antenna and transmission line is working properly or not. It should also be pointed out that transmitter tests should be carried out on a dummy load.

The next item every ham should have is some kind of multimeter. Being able to find a shorted coaxial cable, blown fuse or to verify the voltage from a battery or DC power supply takes a gob and a bunch of guesswork out of finding the failed piece of gear in your station. Multi meters can be had cheaply ether at swap meets or at the local Harbor Freight for under $10.00.

The last and final item many hams already have and only needs casual mention here; a means of monitoring your outgoing modulation. For VHF/ UHF FM that old scanner in the garage works well enough, with the widespread use of trunking and digital modes on public service and commercial radio these days, the old analogue scanners are a dime a dozen. An old scanner makes a good alternative if you don’t have a second FM radio. Monitoring a signal other than FM such as from an SSB transmitter requires a means of attenuating the input signal to keep from overloading the receiver and introducing distortion that may not otherwise be a part of the signal being tested.

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On another note; Last month I had made mention of an affordable way to get into software defined radio. There is a lot of exciting stuff happening right now in that field and some of that excitement is off the beaten path, for instance a project called HackRF promises to bring to the table much more than just an SDR made from a TV receiver dongle. The software defined radio promises to receive from 100MHZ to 6GHZ,. Radio is the operative word, HackRF will also be able to transmit over the same frequency range. Michael Ossmann, the creator of HackRF has a kickstarter fund raising project going in order to raise enough money to go into production and sell HackRF for $300.00, much less than comparable equipment can be had for.
For more information about HackRF Michael Ossmann’s blog;
http://ossmann.blogspot.com/2012/06/introducing-hackrf.html

His Kickstarter project page;
http://www.kickstarter.com/projects/mossmann/hackrf-an-open-source-sdr-platform

A good article on Hack A Day about HackRF, with a good video on the project.
http://hackaday.com/2013/08/01/hackrf-or-playing-from-30-mhz-to-6-ghz/#more-100539

The AMATEUR RADIO CLUB OF EL CAJON Inc.

WA6BGS

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